CLAIMS:

1.   A mobile node moving between IP (Internet Protocol) networks, comprising:

IPv4 (Internet Protocol version 4) processing means for executing services in accordance with said IPv4;

IPv6 (Internet Protocol version 6) processing means for executing services in accordance with said IPv6;

communication processing means for executing transmission/reception control of packets to and from said networks; and

movement registration processing means for adding an IPv4 header (an IP header used for said IPv4), in which an IPv4 address of a mobile agent is set as a foreign address and an IPv4 address of said mobile node usable in a foreign IPv4 network is set as a home address, to a message used for said IPv6 so as to register the movement of said mobile node to said mobile agent connected to an IPv4/v6 network (a network capable of executing communication by utilizing both of said IPv4 and said IPv6) for assisting the movement of said mobile node when said mobile node moves from said IPv4/v6 network to an IPv4 network (a network capable of executing communication by utilizing only said IPv4), and transmitting said message.

2.   A mobile node moving between networks, comprising:

IPv4 (Internet Protocol version 4) processing means for executing services in accordance with said IPv4;

IPv6 (Internet Protocol version 6) processing means for executing services in accordance with said IPv6;

communication processing means for executing transmission/reception control of packets to and from said networks; and

packet transmission processing means for generating an IPv4 encapsulated IPv6 packet by adding an IPv4 header, in which an IPv4 address of a mobile agent on an IPv4/v6 network is set as a foreign address and an IPv4 address of said mobile node usable for a foreign IPv4 network is set as a home address, to an IPv6 packet (a packet used for said IPv6) transmitted from said mobile node to other nodes when said mobile node moves from said IPv4/v6 network to said IPv4 network, and transmitting said IPv4 encapsulated IPv6 packet.

3. A mobile node moving between networks, comprising:

IPv4 (Internet Protocol version 4) processing means for executing services in accordance with said IPv4;

IPv6 (Internet Protocol version 6) processing means for executing services in accordance with said IPv6;

communication processing means for executing

transmission/reception control of packets to and from said networks;

movement detection means for detecting whether or not said mobile node moves from the network in which a mobile agent used by said mobile node to another IPv4 network or to an IPv6 network (a network capable of executing communication by utilizing only said IPv6) or to an IPv4/v6 network; and

movement status management means for managing the movement status so detected.

4.   A mobile agent for assisting the movement of a node executing communication by utilizing an IPv6 (Internet Protocol version 6), comprising:

IPv4 (Internet Protocol version 4) processing means for executing services in accordance with said IPv4;

IPv6 processing means for executing services in accordance with said IPv6;

communication processing means for executing transmission/reception control of packets to and from networks;

mobile node management means for managing IPv4 addresses of said mobile nodes usable in a foreign IPv4 network, when receiving a message used for said IPv6 for registering the movement, which said message is trans-mitted by said mobile node that has moved to said IPv4 network to said mobile agent, and to which an IPv4 header is added; and

movement assistance processing means for adding said IPv4 header, in which an IPv4 address of said mobile node usable in said foreign IPv4 network is set as a foreign address and the IPv4 address of said mobile agent is set as a home address, to a message used for said IPv6 for permitting registration of the movement to said mobile node, and transmitting said message.

5.   A mobile agent for assisting the movement of a node executing communication by utilizing an IPv6 (Internet Protocol version 6), comprising:

    IPv4 (Internet Protocol version 4) processing means for executing services in accordance with said IPv4;

    IPv6 processing means for executing services in accordance with said IPv6;

    communication processing means for executing transmission/reception control of packets to and from networks; and

    transfer-to-other node processing means for removing an IPv4 header when receiving an IPv4 encapsulated IPv6 packet transmitted by a mobile node, and transmitting again said IPv6 packet so taken out to said network.

6.   A mobile agent for assisting the movement of a node executing communication by utilizing an IPv6 (Internet Protocol version 6), comprising:

    IPv4 (Internet Protocol version 4) processing means for executing services in accordance with said

IPv4;

IPv6 processing means for executing services in accordance with said IPv6;

communication processing means for executing transmission/reception control of packets to and from networks; and

transfer-to-mobile node processing means for generating an IPv4 encapsulated IPv6 packet by adding an IPv4 header, in which an IPv4 address of a mobile node usable in a foreign IPv4 network is set as a foreign IPv4 address and an IPv4 address of said mobile agent is set as a home IPv4 address, to a received IPv6 packet when said transfer-to-mobile node processing means receives said IPv6 packet transmitted by other node to said mobile node that has moved to said IPv4 network, and transmitting said IPv4 encapsulated IPv6 packet.

7. A mobile node according to claim 1, wherein said mobile node moves from said IPv4/v6 network to said IPv4 network in a network system in which said IPv4/v6 network and said IPv4 network are connected with each other by a connecting device or by said connecting device and a third network.

8. A method of controlling a mobile node by a mobile agent in a network system in which a first IP (Internet Protocol) network capable of executing communication in accordance with first and second kinds of IPs and a second IP network capable of executing communication in accordance with only said first kind of

IP are connected with each other, so that said mobile
node capable of executing communication in accordance
with said second kind of IP can communicate with other
nodes belonging to said first IP network in accordance
with said second kind of IP when said mobile node moves
from said first IP network to said second IP network,
comprising the steps of:

adding a first kind of IP header in which an IP
address, in accordance with said first kind of IP, of a
second mobile agent belonging to said second IP network
is set as a foreign address by a first mobile agent
belonging to said first IP network and an IP address, in
accordance with said first kind of IP, of said first
mobile agent is set as a home address, to an IP packet in
accordance with said second kind of IP, transmitted from
said other nodes to said mobile node, and transmitting
said IP packet to said second mobile agent; and

deleting said first kind of IP header by said
second mobile agent and transmitting said IP packet to
said mobile node.

9.   A method of controlling a mobile node by a
mobile agent in a network system in which a first IP
(Internet Protocol) network capable of executing
communication in accordance with first and second kinds
of IPs and a second IP network capable of executing
communication in accordance with only said first kind of
IP, so that said mobile node capable of executing
communication in accordance with said second kind of IP

can communicate with other nodes belonging to said first IP network in accordance with said second kind of IP when said mobile node moves from said first IP network to said second IP network, comprising the steps of:

adding a second kind of an IP header, in which an IP address, in accordance with said second kind of IP, of said mobile node relating to said second IP network is set as a foreign address by a first mobile agent belonging to said first IP network and an IP address, in accordance with said second kind of IP, of said first mobile agent is set as a home address, to an IP packet, in accordance with said second kind of IP, transmitted from said other nodes to said mobile node, adding further a first kind of IP header, in which an IP address, in accordance with said first kind of IP, of said second mobile agent belonging to said second IP network is set as a foreign address and an IP address, in accordance with said first kind of IP, of said first mobile agent is set as a home address, and transmitting said packet to said second mobile agent; and

deleting said first kind of said IP header by said second mobile agent and transmitting said IP packet to said mobile node.

10.   A method of controlling a mobile node by a mobile agent in a network system in which a first IP (Internet Protocol) network capable of executing communication in accordance with first and second kinds of IPs and a second IP network capable of executing

communication in accordance with only said first kind of
IP are connected with each other, so that said mobile
node capable of executing communication in accordance
with said second kind of IP can communicate with other
nodes belonging to said first IP network in accordance
with said second kind of IP when said mobile node moves
from said first IP network to said second IP network,
comprising the steps of:

adding a first kind of an IP header, in which
an IP address, in accordance with said first kind of IP,
of a first mobile agent belonging to said first IP
network is set as a foreign address by a second mobile
agent belonging to said second IP network and an IP
address, in accordance with said first kind of IP, of
said second mobile agent is set as a home address, to an
IP packet in accordance with said second kind of IP
transmitted from said mobile node to said other node, and
transmitting said IP packet to said first mobile agent;
and

deleting said first kind of IP header by said
first mobile agent and transmitting said IP packet to
said other node.

11.   A method of controlling a mobile node by a
mobile agent in a network system in which a first IP
(Internet Protocol) network capable of executing
communication in accordance with first and second kinds
of IPs and a second IP network capable of executing
communication in accordance with only said first kind of

IP, so that said mobile node capable of executing communication in accordance with said second kind of IP can communicate with other nodes belonging to said first IP network in accordance with said second kind of IP when said mobile node moves from said first IP network to said second IP network, comprising the steps of:

adding a first kind of an IP header, in which an IP address, in accordance with said first kind of IP, of a first mobile agent belonging to said first IP network is set as a foreign address by a second mobile agent belonging to said second IP network and an IP address, in accordance with said first kind of IP, of said second mobile agent is set as a home address, to a movement registration request message in accordance with said second kind of IP received from said mobile node, and transmitting said message to said first mobile agent;

adding a first kind of an IP header, in which an IP address, in accordance with said first kind of IP, of said second mobile agent is set as a foreign address by said first mobile agent and an IP address, in accordance with said first kind of IP, of said first mobile agent is set as a home address, to a message in accordance with said second kind of IP for permitting the movement, and transmitting said message to said second mobile agent; and

deleting said first kind of said IP header by said second mobile agent and transmitting said message to said mobile node.

12.   A network system for controlling a mobile node
and assisting the movement of said mobile node by a
mobile agent, in which a first IP (Internet Protocol)
network capable of executing communication in accordance
with first and second kinds of IPs and a second IP
network capable of executing communication in accordance
with only said first kind of IP are connected with each
other, so that said mobile node capable of executing
communication in accordance with said second kind of IP
can communicate with other nodes belonging to said first
IP network in accordance with said second kind of IP when
said mobile node moves from said first IP network to said
second IP network, comprising:

a first mobile agent for adding a first kind of
an IP header, in which an IP address, in accordance with
said first kind of IP, of a second mobile agent belonging
to said second IP network is set as a foreign address and
an IP address, in accordance with said first kind of IP,
of said first mobile agent belonging to said first IP
network is set as a home address, to an IP packet in
accordance with said second kind of IP transmitted from
said other node to said mobile node, and transmitting
said IP packet to said second mobile agent; and

said second mobile agent for deleting said
first kind of said IP header and transmitting said IP
packet to said mobile node.

13.   A network system for controlling a mobile node
and assisting the movement of said mobile node by a

mobile agent, in which a first IP (Internet Protocol)
network capable of executing communication in accordance
with first and second kinds of IPs and a second IP
network capable of executing communication in accordance
with only said first kind of IP are connected with each
other, so that said mobile node capable of executing
communication in accordance with said second kind of IP
can communicate with other nodes belonging to said first
IP network in accordance with said second kind of IP when
said mobile node moves from said first IP network to said
second IP network, comprising:

a first mobile agent for adding a second kind
of an IP header, in which an IP address, in accordance
with said second kind of IP, of a first mobile node
relating to said first IP network is set as a foreign
address and an IP address, in accordance with said second
kind of IP, of said first mobile agent belonging to said
first IP network is set as a home address, to an IP
packet in accordance with said second kind of IP
transmitted from said other node to said mobile node,
adding further a first kind of IP header, in which an IP
address, in accordance with said first kind of IP, of a
second mobile agent belonging to said second IP network
is set as a foreign address and an IP address, in
accordance with said first kind of IP, of said first
mobile agent is set as a home address, and transmitting
said IP packet to said second mobile agent; and

said second mobile agent for deleting said

first kind of said IP header and transmitting said IP
packet to said mobile node.

14. A network system for controlling a mobile node
and assisting the movement of said mobile node by a
mobile agent, in which a first IP (Internet Protocol)
network capable of executing communication in accordance
with first and second kinds of IPs and a second IP
network capable of executing communication in accordance
with only said first kind of IP are connected with each
other, so that said mobile node capable of executing
communication in accordance with said second kind of IP
can communicate with other nodes belonging to said first
IP network in accordance with said second kind of IP when
said mobile node moves from said first IP network to said
second IP network, comprising:

a second mobile agent for adding a first kind
of an IP header, in which an IP address, in accordance
with said first kind of IP, of a first mobile agent
belonging to said first IP network is set as a foreign
address and an IP address, in accordance with said first
kind of IP, of a second mobile agent belonging to said
second IP network is set as a home address, to an IP
packet in accordance with said second kind of IP
transmitted from said mobile node to said other node, and
transmitting said IP packet to said first mobile agent;
and

said first mobile agent for deleting said first
kind of IP header and transmitting said IP header to said

other node.

15.   A network system for controlling a mobile agent
and assisting the movement of said mobile node by a
mobile agent, in which a first IP (Internet Protocol)
network capable of executing communication in accordance
with first and second kinds of IPs and a second IP
network capable of executing communication in accordance
with only said first kind of IP are connected with each
other, so that said mobile node capable of executing
communication in accordance with said second kind of IP
can communicate with other nodes belonging to said first
IP network when said mobile node moves from said first IP
network to said second IP network, comprising:

        a second mobile agent for adding a first kind
of IP header, in which an IP address, in accordance with
said first kind of IP, of a first mobile agent belonging
to said first IP network is set as a foreign address and
an IP address, in accordance with said first kind of IP,
of said second mobile agent belonging to said second IP
network is set as a home address, to a movement
registration request message in accordance with said
second kind of IP received from said mobile node; and

        said first mobile agent for adding a first kind
of IP header, in which an IP address, in accordance with
said first kind of IP, of said second mobile agent is set
as a foreign address and an IP address, in accordance
with said first kind of IP, of said second mobile agent
is set as a home address, to a message in accordance with

said second kind of IP for permitting the movement to a
message in accordance with said second kind of IP for
permitting the movement, and transmitting said message to
said second mobile agent.

16.   A mobile agent for controlling a mobile agent
in a network system in which a first IP (Internet
Protocol) network capable of executing communication in
accordance with first and second IPs and a second IP
network capable of executing communication in accordance
with only said first kind of IP are connected each other,
so that a mobile node capable of executing communication
in accordance with said second kind of IP can execute
communication with other nodes belonging to said first IP
network in accordance with said second kind of IP when
said mobile node moves from said first IP network to said
second IP network, comprising:

        means for adding a first kind of header, in
which an IP address, in accordance with said first kind
of IP, of a second mobile agent belonging to said second
IP network is set as a foreign address and an IP address,
in accordance with said first kind of IP, of said mobile
agent itself belonging to said first IP network is set as
a home address, to an IP packet in accordance with said
second kind of IP transmitted from said other node to
said mobile node, and transmitting said IP packet to said
second mobile agent.

17.   A mobile agent for controlling a mobile node in
a network system in which a first IP (Internet Protocol)

network capable of executing communication in accordance
with first and second kinds of IPs and a second IP
network capable of executing communication in accordance
with only said first kind of IP are connected with each
other, so that a mobile node capable of executing
communication in accordance with said second kind of IP
can communicate with other nodes belonging to said first
IP network in accordance with said second kind of IP when
said mobile node moves from said first IP network to said
second IP network, comprising:

means for adding an IP header, in which an IP
address, in accordance with said first kind of IP, of a
first mobile agent belonging to said first IP network is
set as a foreign address and an IP address, in accordance
with said first kind of IP, of said mobile agent itself
belonging to said second IP network is set as a home
address, to an IP packet in accordance with said second
kind of IP transmitted from said mobile node to said
other nodes, and transmitting said IP packet to said
first mobile agent.

18.   A mobile agent for controlling a mobile node in
a network system in which a first IP (Internet Protocol)
network capable of executing communication in accordance
with first and second kinds of IPs and a second IP
network capable of executing communication in accordance
with only said first kind of IP are connected with each
other, so that a mobile agent capable of executing
communication in accordance with said second kind of IP

can execute communication with other nodes belonging to said first IP network in accordance with said second kind of IP when said mobile node moves from said first IP network to said second IP network, comprising:

means for adding a first kind of an IP header, in which an IP address, in accordance with said first kind of IP, of a first mobile agent belonging to said first IP network is set as a foreign address and an IP address, in accordance with said first kind of IP, of said mobile agent itself belonging to said second IP network is set as a home address, to a movement registration request message in accordance with said second kind of IP received from said mobile node, and transmitting said message to said first mobile agent.

19.   A mobile agent for controlling a mobile node in a network system in which a first IP (Internet Protocol) network capable of executing communication in accordance with first and second kinds of IPs and a second IP network capable of executing communication in accordance with only said first kind of IP are connected with each other, so that a mobile node capable of executing communication in accordance with said second kind of IP can execute communication with other nodes belonging to said first IP network in accordance with said second kind of IP when said mobile node modes from said first IP network to said second IP network, comprising, wherein:

said mobile agent belonging to said first IP network adds a first kind of an IP header, in which an IP

address, in accordance with said first kind of IP, of a second mobile agent belonging to said second IP network is set as a foreign address and an IP address, in accordance with said first kind of IP, of said mobile agent itself is set as a home address, to a message in accordance with said second kind of IP for permitting the movement, and transmitting said message to said second mobile agent.

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